Voice Controlled Robot Through Android Application

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Abstract: *A robot is usually an electro-mechanical machine that is guided by computer and electronic programming. Many robots have been built for manufacturing purpose and can be found in factories around the world. Designing of the latest inverted ROBOT which can be controlling using an APP for android mobile. We are developing the android app by which we can control the robot motion by using voice command. And in which we use Bluetooth communication to interface controller and android. Controller can be interfaced to the Bluetooth module though UART protocol. According to commands received from android the robot motion can be controlled.*

Keywords: Android Smartphone, Bluetooth module, robot, single microcontroller chip

1. Introduction

This paper proposes a system whereby the human voice become a specific key to manipulate a robot, but nowhere a speech recognition module is used. In this system an android application is used to recognize human voice and is converted to text. This text is further processed and used to control robot. Keeping in mind he need of the day (requirements of the present day), our goal is to move towards making accessible to the manipulation of everyday objects to individuals with motor impairments. But voice (or speech) recognition module involves a high cost when it comes to practicality (reality). Using our system we perform several studies on control style variants for robots. Results show that it is indeed possible to learn to efficiently manipulate real world objects with only voice (human voice) as a control mechanism. Our results provide strong evidence that the further development of voice controlled robotics will be successful.

2. Purpose

The purpose of our research is to provide simpler robots hardware architecture but with powerful computational platforms so that robot's designer can focus on their research and tests instead of Bluetooth connection infrastructure. This simple architecture is also useful for educational robotics, because students can build their own robots with low cost and use them as platform for experiments in several courses.

2.1 AT89S52

The AT89S52 is a low power, high performances, CMOS 8-bit microcontroller with 8Kbytes of in system programmable flash memory. The device is manufactured using Atmel's high density non-volatile memory technology and incompatible with the industry standard 80C51 instruction set and pinout. The AT89S52 is a powerful microcontroller which provides a highly flexible and cost effective which provides a highly flexible and cost effective solution to many embedded control application .The AT89S52 provides the following standard features: 8Kbytes of flash, 256 bytes of RAM, 32 I/O lines, watchdog timer, two data pointers, three 16-bit timer/counters, a six vector two level interrupt architecture, a full duplex serial port, on chip oscillator, and clock circuitry. The AT89S52 is designed with static logic for operation sown to zero frequency and supports two software selectable power saving modes. The power down mode saves the RAM contents but freezes the oscillator, disabling all other chip function until the next interrupt or hardware reset.

2.2 HC-05 Bluetooth module

HC-05 is a serial Bluetooth protocol of Bluetooth serial interface module and Bluetooth adapter. Bluetooth serial module is used for converting serial port to Bluetooth.

Specifications:

1) Bluetooth Protocol V2.0
2) Range – 10 meters
3) Frequency – 2.4GHz ISM
4) Modulation – GFSK

5) Transmit power – 4dBm
6) Sensitivity – 8dBm
7) Power supply - +3.3V
8) Rate – 2.1Mbps(Max.)

2.3 L293D

The L293 and L293D devices are quadruple high current half H-Drivers. The L293 is designed to provide bidirectional drive currents of upto 1A at voltage from 4.5V to 36V. The L293D is designed to provide bidirectional drive currents of upto 600mA at voltages from 4.5V to 36V. both devices are designed to drive inductive loads such as relays, solenoids, dc and bipolar stepping motors, as well as other high current/ high voltage loads in positive supply applications.

2.4 DC Motors

Almost every mechanical movement that we see around us is accomplished by an electrical motor. Electric machines are means of converting electrical energy into mechanical energy. Electric motor is used to power hundreds of devices we use in everyday life. An example of small motor applications includes motors used in automobiles, robot, hand power tools and food blenders. Micro-machines are electric machines with parts with the size of red blood cells and find many applications in medicine.

2.5 UART

Universal Asynchronous Receiver Transmitter is usually an individual integrated circuit used for serial communications over a computer or peripheral device serial port. UART are now commonly included in microcontrollers. A dual UART combines two UARTS into single chip. Many modern ICs come with a UART that can also communicate synchronously. These devices are called UART.

3.   Block diagram

Voice controlled robot through an android application. Now here it is simple to control your robot using Bluetooth module HC-05 and AT89S52 microcontroller with your android smartphone device. The controlling devices of the whole system is a microcontroller. The data receive by the Bluetooth module from android smartphone is fed as input to the controller. The controller acts accordingly on the DC motor of the robot. The robot in the project can be moved in all the four directions using the android phone. The direction of the robot is displayed on the LCD display of the robot system. In achieving the task the controller is loaded with program written using embedded 'C'

languages. Voice controlled robot through an android app is as shown in fig 1.1.
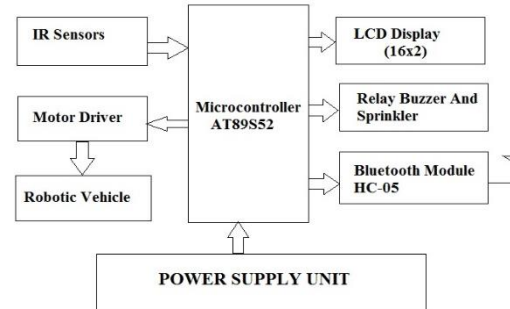

Fig 1.1 Block diagram of voice controlled robot through an android application.

4.   Application instructions

4.1 First make sure your HC-05 Bluetooth is paired with your mobile. The default password is "1234" or "0000". Check the manual of Bluetooth module.

4.2 Click on the "SELECT DEVICE" icon to select paired Bluetooth module.

4.3 When we give voice command as "FORWARD", the robot moves in the forward direction.

4.4 When we give voice command as "BACKWARD", the robot moves in the reverse direction.

4.5 When we give voice command as "RIGHT", the robot turns in the right direction.

4.6 When we give voice command as "LEFT", the robot turns in the left direction.

4.7 When we give voice command as "STOP", the robot stops its functioning.

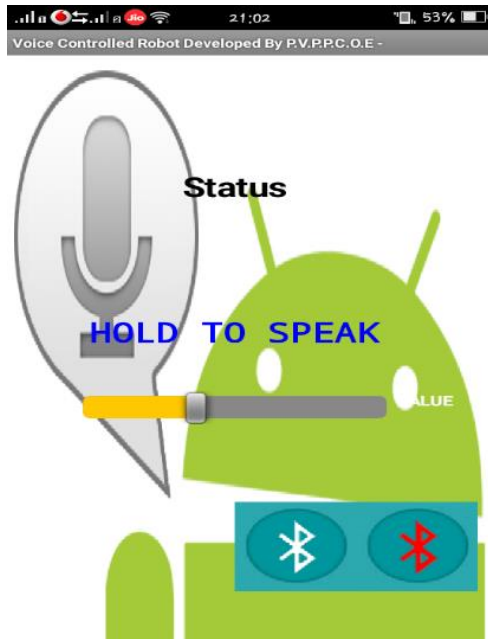**4.8** Click on Disconnect icon to disconnect the paired Bluetooth module.

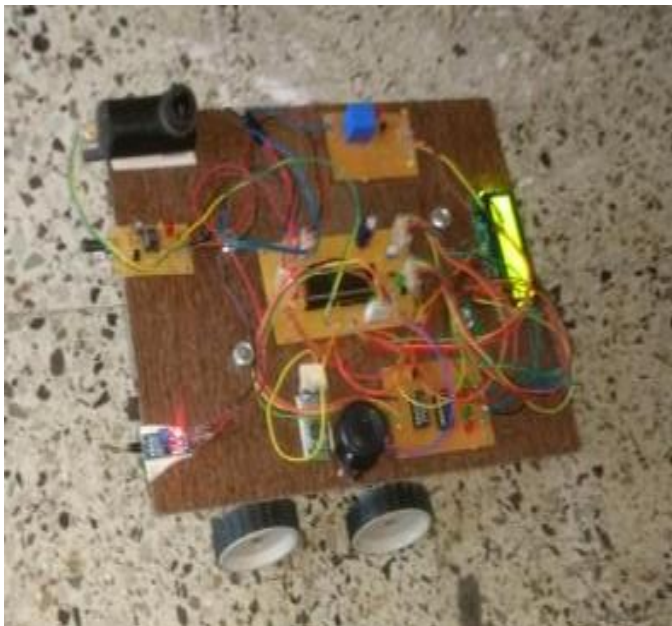**Fig 1.2** screenshot of the app used to control the robot

Fig 1.3 Voice Controlled Robot Through Android Application.

5. CONCLUSION

The objective of the paper is to realize the smart living, more specifically the home lighting system using the Bluetooth technology. Robot and smartphones are a perfect match, especially mobile robots. As phones and mobile devices are each time powerful, using them as robot for building robot with advanced features such as image processing. Android Bluetooth enable phones and Bluetooth module via HC-05 and communication among Bluetooth devices. It is concluded that smart living will gradually turn into reality that consumer can control their home remotely and wirelessly.

6. Future Work

The knowledge is ever expanding and so are the problems which the mankind strive to solve. In this spirit, it is hoped that the current activity will lead to further enhancements. For example, work on future for defense applications.

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